IMPLEMENTING COMMON SYSTEMS:

ONE ORGANIZATION'S EXPERIENCE

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INTRODUCTION

Common Systems are a strategy for large-scale development that can provide economies of scale and optimal use of scarce technical expertise. Rather than have every division build, say, an order entry system, a central group defines a core system which may be modified to fit local units' needs. In some instances, a Common System is designed to replace existing, incompatible systems and thus provide an integrated reporting capability and standardized data elements. .

Common Systems do not involve any innovative or distinctive technology, although they frequently rely on telecommunications and data base management systems, which may be relatively new to the organization. They do, however, pose complex problems of design and management.

This paper describes the experience of a large bank in implementing a Common System in almost 40 countries. The system is central to the organization's long-term strategy and has been its major systems development effort over the past five years. From the start, the project has had major support from senior corporate management.

The relative ease of implementation and degree of success have varied widely across divisions. The differences provide clear general lessons about both organizational and technical factors in managing Common Systems development. In particular, they highlight:

    (1) the myth of "user involvement"; involvement is too often defined as passive participation; it needs to be viewed in broader terms, and issues of authority, accountability and leadership explicitly addressed

    (2) the value of education as "technology mobilization", to lead rather than follow implementation

    (3) the need to balance and integrate the roles of central and local groups

(4) the new technical problems Common Systems raises, such as the definition of the "core", the importance of local vendor expertise, and the difficulties of local maintenance of a centrally defined system

(5) the importance of an explicit policy on central authority versus local autonomy

2. ARNOLD BANK AND TRUST

Arnold Bank and Trust is one of the 30 largest banks in the U.S. Its corporate lending group, for which the Integrated Processing System (IPS) was built, operates in almost sixty countries. Arnold, like all international banks, faces major new business challenges. Its "spreads", the difference between interest charged on loans and the bank's own borrowing costs, have fallen to a point where profits and revenue growth almost entirely depend on major shifts from lending to fee-based services. Labor costs are rising rapidly and amount to about 60% of the company's cost base. Competition from non-banking organizations is growing. "Electronic banking" - electronic funds transfer systems and cash management services in particular - are becoming major factors in international banking. Customer service is the key determinant of success; where accurate, fast processing of transactions is essential, Arnold's performance is only average.

Arnold has four world-wide divisions: Europe, Latin America, Far East, and Middle East. It is highly decentralized. While most of its business is in dollar loans or involves US corporations, local market needs and characteristics vary widely. The bank's "front office" in each country provides marketing, lending and credit management, and its "back office" handles all operations and processing of transactions.

Arnold has a central development group in Milan; this was created when the decision was made to implement IPS world wide. Each country has a

local data center; the larger ones have their own development staffs. The main computers in use are IBM 4341's. Arnold has a private telecommunications network that operates between the US, Europe and a few countries in the Far East and Latin America. It also makes heavy use of TELENET and SWIFT, an international banking network.

3. IPS

The objective for IPS is ambitious: real-time processing of all the bank's transactions for all its major products. These include loans, letters of credit, foreign exchange deals, mortgages, leases, etc. Data are stored at the transaction level, and data elements are standardized across countries. A long-term aim for IPS is global customer integration, the ability to manage a major multinational client as a single entity, even though its subsidiaries have accounts in different countries, and hence have irreconcilable customer identifying codes.

IPS grew out of a system built in Milan in the early 1970's and is based on Italian banking practices. The decision to implement it worldwide was made in 1976. IPS is written in standard COBOL and does not draw on major software productivity aids, such as structured methods. There is no data base management software. Transactions are saved and tagged with cross reference codes in which reports can be aggregated from these detailed records. IPS contains over a dozen major functional modules, corresponding to the bank's major products. The core system almost always needs local modifications.

Milan spearheads the implementation effort. The local unit will generally send several key staff to Italy to learn the system. The individual country determines which functions will be built first. In mid-

1981, IPS was operational in 24 countries with more than 15 underway or scheduled for start-up.

4. DEVELOPMENT STRATEGIES

The development strategy for IPS, at both the central and local level, has changed significantly since the early implementations. Since Arnold had never before built a Common System, it is not surprising that it underestimated what was involved, especially at the local level. The change in development strategy is a main theme of the rest of this paper.

The major shifts in strategy are shown below.

Strategy: from PARACHUTING to ACCULTURATION

Pace   : from CRASH to FILTER

Focus   : from TECHNOCENTRIC to ORGANIZATIONAL

The parachuting strategy was used in the first implementations. Milan had successfully built, tested and installed IPS in Milan and two other European countries. When the decision was made by Thassin, a Middle East country, to adopt IPS, Milan assumed that it could send the program tapes directly to Thassin, who in turn assumed that only a few months of largely technical effort would be needed to install it. The consequent surprise was great and disruptive. The experience of implementing IPS resulted in a significant loss of morale and a continued "We - They" gap between users and technicians.

Asilta, in Latin America, saw the problems parachuting had caused in several other countries and relied instead on acculturation: making sure there was a sense of local owership, investing heavily in education and building formal user liaison roles.

Several countries used a _crash_ pace; the priority was to get the technical system up and running as quickly as possible and then to deal with training and organizational problems. The _filter_ approach increasingly used in later implementations adjusts the pace of development to the organization's ability to assimilate the change. This delays the installation of the system but significantly eases its institution-alization.

The _technocentric_ focus, apparent in several countries, sees implementation as centering around technical development; the technicians both dominate the planning process and determine the sequence and timing of phases. The _organizational_ focus places far more responsibility on senior users. User "involvement" and "education" are entirely different and play a more active role in implementation in this latter case.

5. THE RESEARCH STUDY

The three dichotomics were identified prior to carrying out the comparative case studies described later in this paper. These were part of a larger research project examining policy issues in managing computer technology[1]. Interviews with over 100 senior users, managers and technical personnel in most of the countries where IPS had been installed provided a broad overview of experiences, management's role, outcomes and user satisfaction. On the basis of the interviews, nine countries were selected for detailed study. Figure 1 lists them, together with brief summaries of key implementation factors and outcomes.

FIGURE 1

CASE STUDIES: IMPLEMENTATION FACTORS AND OUTCOMES

COUNTRY	STRATEGY	USER INVOLVEMENT	LEADERSHIP ROLE	TECHNICAL ISSUES	OUTCOME
COLIADOR	Parachuting	Very limited: strong control from Milan	Milan technologists: weak operations group: top mgmt. "invisible"	poor quality of operations resulted in major data problems and lack of coordination	IPS well behind schedule: major reorganization likely
BOTHNIA	Parachuting crash pace	deliberate exclusion of secondary users to avoid potential resistance	operations: no clear commitment by top management	deliberate "crash" strategy meant no attention paid to accounting controls: poor local vendor expertise: frequent system crashes	system installed: continuing dissatisfaction and resistance; problems with data quality and controls; need for more training
THASSIN	Parachuting	strong effort to involve primary users; no involvement of secondary ones	strong leadership from operations passive commitment by senior mgmt.	changes to original system make it incompatible with other countries	installed in 6 months; several years of follow-up support to get system stabel continued culture gap and conflict between technicians and users; viewed as "psychological disaster"
FARLIA	Acculturation	formal liaison roles; education for "technology mobilization"	senior user representative, top management provided explicit authority	–	ongoing; no major problems apparent still some complaints from secondary users that involvement starts too late

FIGURE 1
CASE STUDIES: IMPLEMENTATION FACTORS AND OUTCOMES
(con't)

COUNTRY	STRATEGY	USER INVOLVEMENT	LEADERSHIP ROLE	TECHNICAL ISSUES	OUTCOME
ASILTA	Acculturation	formal liaison roles; so strong commitment to education	public commitment by top management; strong leadership from head of operations and systems; Milan as advisers/consultants only	interface modules built to insure "integrity" of core system; strong support from local vendor office	fairly smooth installation; system successfully institutionalized
FANO	Local development	—	open rebellion by heads of operations and systems; refusal to use IPS: purchase of mini and packages	existing system incompatible with IPS: threatens corporate integration	no timetable for IPS; substantial local opposition
CATHAY	Local development	limited; systems staff disdainful of marketing and operations	systems; top mgmt. opposed to IPS	Cathay version of IPS involves many changes; incompatible with other countries; major problem emerging in how to maintain system	major delays in implementation; continuing local opposition
ESONDINA	Parachuting	almost none; systems staff work with key operations personnel	no clear leadership; reliance on Milan	—	major "clean-up" problems; limited use; user dissatisfied; need for education
GATLAND	Parachuting plus local development technical	limited; very strong resistance to IPS from operations and marketing	systems	Gatland is one of largest and most complex countries; major changes being made to core; almost a rewrite of IPS	IPS well behind schedule; continued problems of design, coding and testing, potential fiasco

The criteria for selecting the sites were:

(1) development strategy: parachuting/acculturation

(2) pace: crash/filter

(3) focus: technocentric/organizational

(4) perceived ease of implementation: disruptive/smooth

(5) geographic dispersion

(6) size of country and complexity of operations

Two countries, Thassin and Asilta, which were at extremes on criteria 1-4 above, were selected for most detailed study.

The case studies were based on a "controlled comparison" methodology suggested by George (1978). They were not exploratory but intended as limited theory-testing and as theory-building. The "probes" – organizing questions the research team used to guide their interviews – were based on a paradigm of implementation as a process of managing organizational change (Keen, 1981a). This perspective, particularly when expressed in terms of the influential Lewin-Schein and Kolb-Frohman models (Figure 2), has substantial theoretical and empirical support as a general descriptive and prescriptive conception of implementation, (see Keen, 1977)

This paradigm provided a focus and guide for the studies. Key questions were:

(1) Pre-installation: How was the idea of the system introduced to users? Was there a "felt need"? How did the central and local development staff and the users see their roles? Was a joint contract for change built?

(2) Installation: What resources, technical and nontechnical, were committed to the project? What were missing? What was the nature of any user "involvement"? What type of leadership did management provide?

(3) Post-installation: How was the system handed over to
the local unit? Was its value established and user
expertise built? What training and support were
provided? What was the perceived impact on work,
skills, communication, and influence at all levels
of both the front and back offices?

The organizational change paradigm was used for theory-testing in
the sense that it provided a prior explanation of the major factors likely
to influence the success and failure of particular development stragegies.
The more important dimension was theory-building:

(1) what distinctive implementation factors are relevant
to the special case of Common Systems?

(2) do Common Systems require different design
techniques from traditional single-site systems?

In theory-testing mode, the research team looked for goodness of fit and
counter examples. For theory-building, it tried to surface events,
outcomes and opinions which required additional explanation.

The main case studies involved at least 30 interviews per site. A
careful effort was made to sample individuals at all levels and across all
functions and to avoid dependence on one group or viewpoint. The cases
rely on the observers' interpretation. The history of a complex
organizational process of this sort poses problems that in the end defy
"objectivity":

(1) no one in the organizational unit has a complete
picture

(2) statements even on "facts" vary dramatically and are
uncheckable

(3) many of the key events, actions and objectives are
not documented

(4) there are many hidden agenda, especially around
political issues and individual career goals

(5) a powerful mythology grows up around major
organizational innovations.

FIGURE 2

ORGANIZATIONAL CHARGE PARADIGM OF IMPLEMENTATION

LEWIN-SCHEIN

unfreezing- break out the status quo so that the organization feels the need to change

moving: presenting direction for change; developing new system

refreezing: integrating the change into the ongoing work habits of the organization

KOLB-FROHMAN

Scouting: ensuring a match between the change agent's skills and the organizations needs

Entry: create "felt need"; developing relationship between consultant and user; building contract for change based on realistic, mutual expectations and operational goals; eliciting and responding to resistance

Diagnosis: analysis of existing system and needs for new system

Planning: detailed specifications; allocation of necessary technical and nontechnical resources; benefit analysis

Evaluation: review of progress in relation to operational goals and benefit analysis

Termination: completion of training; meshing system with organizational control and communication patterns; transfer of system ownership to users

create climate for and contract for change

Technical Analysis and Design

Institutionalization

The research team used several techniques to crosscheck information, including in one instance, hiring an outside expert with no knowledge of TPS or the organization. His sole job was to get the viewpoint of several key actors to counterbalance that which the rest of the research team had been given by individuals who had different interests and with whom they had been in conflict. It was felt that the researchers had a mental set that would bias any interviews with those actors. The depth and bread of the samples ensured that no group's perspective was overlooked. The Thassin and Asilta studies in particular were very detailed and the comparative approach prevented the atheoretical narrative focus of most case studies.

That said, the research is case-based. Case studies are a contentious methodology, that obviously cannot meet tests of "rigor" or objectivity[2]. They seem the essential vehicle for studies of complex "n=1" organizational events in which there are intertwined individual and group issues, opinion and fact, politics, technology and history. The conclusions arrived at from the comparative case studies seem firmly grounded in "data".

6. COMPARATIVE CASE STUDIES: OVERALL RESULTS

In general, the early implementations of TPS used parachuting and a crash pace. The firm viewpoint of the local and central technical staff seemed to be that a major advantage of TPS was that it was an "operational" system. It "worked".

In practice, the system needed far more local modification than was expected. Instead of the "core" amounting to 90% of the system and 10% being local add-on, the ratio was probably closer to 60-40%. Obviously,

the local unit's expectations about the type and degree of effort involved
mainly depended on its assumption - or the central development staff's
statement - about the core.

A common complaint in the parachuted implementations was that IPS
was based on Italian banking. Minor differences in local markets might
mean major changes to the code, which was not well-documented. The Milan
group was seen as forcing the system onto the local unit, when in fact it
seems clear that it was really unaware of the problems posed by local
banking proceedures.

In general, the parachuting strategy led to major, predictable
problems. In particular, even where IPS has been "operational" for a year
or more, users complain it is still not implemented. In terms of the
social change paradigm, this is a typical indication of a system not being
institutionalized or "refrozen". The introduction of a system that
requires major changes in jobs and proceedures breaks open the status quo.
It is a type of organizational experiment, given momentum from top
management's commitment and the allocation of significant nonroutine
resources. Parachuting takes the local unit by surprise; no preparation is
made to handle the uncertainty and strain and no resources allocated to
mesh the new system into its organizational context.

There is evidence that Milan initially saw local complaints about
the unexpected effort required to adopt IPS as "footdragging" and
"not-invented-here". Parachuting partly reflects the central development
team's confidence in the quality and completeness of its system; it can
hardly be expected to support a strategy of acculturation which in effect
views the Common System as a starting point, not an end point.

Parachuting was, however, successful in at least four countries. (This conclusion is not based on the case studies but on earlier interviews.) In every case, this was a small unit where there was little or no use of computers. IPS represented a major improvement in capability, and was eagerly accepted. Most importantly, the organization could easily be adopted to the system. In larger countries, parachuting depended on this occurring but organizational inertia, lack of a felt need for change and user resistance prevented it. The acculturation strategy adapted the system to the organization.

The parachuting strategy increased the culture gap between the technical group and the users. It was interesting to the researchers to note how capable, motivated individuals on each side of the chasm separating the bringers of change and the receivers try to explain the outcome. The technicians tend to assume problems in implementation reflect laziness or incompetence on the users' part and, in turn, users see the technicians as empire-building. A distinctive feature in the interview data gathered for the case studies is the pain, anger and deep sadness users express several years after the event, when they reflect on what happened after they stood on the landing zone waiting for the IPS tapes to float down.

A major surprise in the interview data, however, is the technical staff's emphasis on user involvement. In Thassin, which represents the extreme of parachuting, the technical staff stress the extent to which they consulted "users". In Farlia, some users complain they were never consulted, at the same time as the technical staff describe the mechanisms specifically created to provide a liaison role between users and developers.

This contradiction is easily explained. The parachutists define "users" as those individuals directly <u>involved</u> in the development of the IPS. The acculturists define them as those <u>affected</u>. The former are primary users and are mainly personnel in operations and data entry. The latter are secondary users: managers and staff in the front office functions of lending and credit. In one sense there was <u>higher</u> user involvement with parachuting than with acculturation, especially when a crash pace was adopted. A small, tightly knit group of programmers and Operations staff worked very, very long hours to install the system. There was a sense of pride and even herosim. Operations played a key role; the whole business of the bank depended on their ability to bring up IPS. <u>They</u> were the users.

The need for user involvement is one of the cliches in the systems development literature. The case studies highlighted several questions of general relevance:

(1) Who is the "user"?

(2) What <u>is</u> "involvement"?

(3) What are the consequences of involving primary rather than secondary users?

It seems obvious that semantics matters. In Thassin, the development team explicitly tried to involve users. Their narrow concept of who the user is has had some disastrous long-term consequences (see Section 8).

Parachuting seemed to be associated with passive leadership by top management. This may be because a Common System is brought in from outside. It needs to be explained to top management. If the expectations of those directly responsible for implementation are that this is a straightforward technical venture, top management will be likely to delegate authority and assume a passive role.

All the top managers interviewed stated they were "committed" to IPS from the start. Several, though, strongly feel that they should in retrospect have been more actively involved in planning and that they did not have a clear idea of just what had happened in the immplementation process. They were surprised and disturbed that after the system had been installed so much work still had to be done, expecially in the areas of data validation and control and training.

The need for top management involvement is another central part of the systems development litany. The case studies again raise general questions:

(1) How active a role must top management play?

(2) What is the distinction between committment and involvement?

(3) When should involvement begin and end?

Later implementations of IPS increasingly used the acculturation strategy. A new formal staff job evolved: the user representative. The user rep is responsible for liaison between users and technicians and between the front and back offices. The reps must have high credibility. There is a need to create a career path for them (see Section 9).

The decision to extend Milan's small original system and create a Common System was made directly by the CFO. Opinions varied widely as to the quality of IPS and the need for a single system worldwide. Previously, systems development had been handled on a fairly decentralized basis.

Several units strongly opposed IPS:

(1) larger countries which already had many of the capabilities of IPS felt that the cost of conversion would be disproportionate to the additional benefits

(2) in the Far East, where local market conditions are volatile and extremely competitive, the bank's business is very different from Europe and the US;

some countries argued that IPS was unsuited to their
needs. They were also unwilling to delay needed
development of individual subsystems and wait for up
to two years for IPS.

Fano and Cathay, both in the Far East, openly rebelled. The head

of the systems group in Fano convinced his senior managers to authorize the

purchase of a mini-computer and software packages. The cost was under

$100,000 and provided a useful capability very quickly. Proponents of

local development cited Fano's experience to support their case.

Proponents of the Common System countered that Faro went for a short-term

gain that in the long-term loses the far greater benefits of global

customer integration, corporate reporting and standardized data elements.

In addition, it diverted scarce resources, especially management time and

technical staff, and delayed IPS even more.

IPS remains contentious, although the need for a Common System is

now generally accepeted, even the Far East. The Milan systems group, which

sees itself simply as the coordinator of the shared venture is viewed by

some as empire-builders and even autocrats. The whole question of

authority has been blurred throughout the implementation of IPS. It seems

that this may be a general problem with Common Systems, unless the issue is

explicitly addressed:

(1) top management provides a directive or mandate for
the Common System,

(2) the central development team has a responsibility to
meet that directive and to ensure the Common System
is indeed common,

(3) local management systems personnel are responsible
both for installation and for making the system
compatible with business priorities, local
conditions and organizational needs.

(2) and (3) are always potential in conflict. Ambiguous authority

generates political stress that is not easily resolved. In several

FIGURE 3
SELECTED QUOTES FROM CASE STUDY
INTERVIEWS

PARACHUTING

It was a surprise things didn't work so easily. We thought we just had to slap on a program that was already developed. (Systems)

Early non-European implementation is where we had our problems, yet Milan did not see that as their accountability. They came in "gave us the system and left". From their point of view, a job well done, from ours, a nightmare.
(Country head)

It would have taken us much longer to create an IPS - like system on our own but the process would have been smoother and there would be less maintenance. (Country head)

IPS in our branch had quite a few problems:
1. The technologists came and said it was the answer to solve all our problems. Two years later implementation day arrives.

2. In two years we did nothing. Marketing people gave it the lowest priority.

3. The fault is clearly ours (marketing). If we (the senior people) didn't go to the meetings why should the others take it seriously.
(Marketing Manger)

USER INVOLVEMENT

The designers needed to be closer to respond to what we needed. We became the slave to what they thought we ought to have. (Pranch Manager)

There was no response when managers were asked what type of screen they wanted. Marketing people are generally stumped when asked directly to systems people just what it is they want. (Systems)
Meetings that I had with Operations were interrogatory, not participative. They'd say "Why do you need it". . . not "let me understand what you need. . ." (Marketing)

It was always very difficult to get the users to participate. If the users had more knowledge about what they really wanted, if senior management had emphasized their interests, it could have contributed to a cleaner, more defined implementation plan. (Systems)

ROLE OF LOCAL AND CENTRAL DEVELOPMENT GROUPS

Top management must understand the need for commitment and control. Milan is not under our control. Schedules should not be made without the formal involvement of users in the countries who establish priorities. (Operations)

Its alright if people come from abroad to help with the implementation, but they have to come in order to consult with the local people to learn about local requirements. What's good to Asilta isn't good for Coriador. (Systems)

Many of the transaction variables such as multiple interest rates on one contract, are ridiculous, but that is the market here. (Marketing)

The ⌈Fano⌉ system defeats the goal of intergration but we could either add 30-40 head count and lower service quality, sign up for IPS and wait to build our own system. (Systems)

IPS is attractive because it's all there, it can be installed from a distance, the hardware is easy to operate, it's reliable. (Senior Milan Technology Manager)

It's a big mistake to take something like this and try to implement it worldwide. The regulations and taxs are different in every country. You end up with 1000 instructions for an operation when you only need a simple multiplication. Then to change it you take a lot of time and money and the program isn't as good. (Systems)

USER LIAISON

I gave the IPS team a 10-year man, a good guy. . It was well worth it. (Country head)

You need to be aggressive (in getting user representatives). It is hard to squeeze staff out of senior management. (Senior user representative)

In country A, there was no user rep for IPS. In B, the user rep was not familiar with local regulations, this type of thing causes huge problems in implementation. (Operations)

The user liaison people were poor quality. (operations)

EDUCATION

We need a reassurance program for the marketing guys. (Systems)

I went around to drum up enthusiasm from the other groups. . . but it just didn't work. (Why?) They don't understand the system and they don't care. (Marketing)

You have career experience and are good at certain things. The machine makes you feel dumb. (Operations)

I think the key is that there needs to be more attention to the education of personnel and the design of the implementation process. Pressure to implement quickly has great costs in the long run. (Country head)

Milan said they are user driven – I don't believe it, but I don't blame them; most users have not been taught. (Country head)

I still don't understand TPS. No one helps us . . .It disabled some department heads. If you don't understand it, you're out of luck. (Marketing)

LEADERSHIP AND COMMITMENT

We just didn't do our homework . . . We oversold TPS and didn't follow through. (Senior manager)

I don't think about technology much. It would need a cultural change to get me going. I was never geared to think of technology as changing the dynamics of my business. I don't see any direction from the top. (Marketing)

Technology is managed up not down. Decisions to buy technology are made because people down below tell the people at the top who can't decide because they don't know enough about the details. (Senior Systems)

To get marketing involved, the country head has to support the system. He has to tell them to get involved, and he has to build a relationship between marketing and operations.
(Systems Manager)

THE NEED FOR A REFEREE

Can we really satisfy the needs of all the users? Someone needs to set priorities. (Operations)

I play the referee between the department . . . The problem today is to satisfy all the users. We need a policy right up front to say, this is the way to do it. (Operations)

With any Common System you must have a local referee, good local auditor and someone to help you avoid reinventing the wheel. (Country head)

countries users or systems personnel caught in the middle complained of the need for a "referee", someone to turn to who can cut through the arguments and impose a decision.

This general discussion of the case studies mainly focusses on problems: parachuting, passive involvement of users and managers and blurred authority. Section 10 of this paper switches perspective and looks at the highly effective strategy used in Asilta. Asilta seems almost a textbook case of how to implement IPS. The senior operations manager and head of systems who developed the strategy there spent substantial time talking with people in other countries that had earlier installed IPS. They visited Esondina for five months and felt that Esondina's experience was invaluable in alerting them to the complexity involved in implementing a system created far away but that affected every aspect of the organization.

At a presentation to senior management, after IPS had been installed, the Esondina development team showed a slide entitled "IPS - A Culture Shock". Points made on the slide included:

(1) many people who are impacted by IPS get no benefits;

(2) stress needs to be lessened by upfront publicity and underplaying the benefits;

(3) do not isolate the user representatives; get good quality people;

(4) ensure there is on-going, in-depth training throughout the organization.

This slide is virtually an epitath for parachuting. Figure 3 provides representative quotes the case study interviews that provide concrete illustrations of the issues discussed above.

7. TECHNICAL ISSUES

IPS is a large system built in COBOL using traditional programming methods. The case studies indicate several problem areas when even standard technology is used for a Common System:

(1) the definition of the "core"

(2) data base conversion

(3) local vendor expertise

(4) centralized design, with decentralized maintenance

(5) auditing and control

A Common System falls somewhere along a spectrum whose end-points are:

(1) complete local custom-tailoring

(2) complete generalization

A generalized system is a software package that can be installed in a local unit with no changes to the program code or data definitions. A custom-tailored system is specially programmed to meet local needs. All the individual systems across the organization may perform the same functions and perhaps generate the same outputs, but clearly they are not a Common System.

If a completely generalized package can be defined, every unit in the organization uses a copy of the same software. In the case of IPS, parts of the code had to be modified or extended to meet local needs. The Common System thus contains a core and local add-ons. The key question is--is the core 80% of the system, 60%, or 30%?

The Milan group initially viewed it as almost 100%. Fano, who rebelled, saw it as 20% or so. IPS would have been far easier to install had the core been more clearly defined. The system is cumbersome. In

their effort to be fully generalized, the Milan team built complex, large routines. To change, say, the foreign exchange module, programmers in the local unit have to know the code in great detail. It would have been far easier for them to deal with a simpler, more clearly structured (and documented) core that provided 60% of functional needs.

The example of payroll may clarify the distinctions made here. A Common payroll system in a multi-divisional company may have as its core:

(1) routines to calculate wages, federal taxes and company pension and medical contributions

(2) parameterized routines to handle state and local taxes.

The individual divisions may have to add routines for local union contract provisions, state requirements, etc.

We can illustrate problems that arose with TPS by analogy with CPS, a Common Payroll System:

(1) differences in local taxes vary so widely that they cannot be handled by parameterized subroutines;

(2) local union contracts mean not only writing add-on routines but modifying the main wage calculations;

(3) these changes involve adding new data elements to the records, introducing problems of interfaces between modules;

(4) a division in, say, Canada is told that because TPS is generalized, there will be no difficulty adapting it to Canadian taxes.

The more standardized the application, the larger the core can be as a fraction of the whole system. With payroll, most corporate and federal calculations and reports are the same for each location. For international banking, some modules are fairly generalizable-foreign exchange or letters of credit- but loans or leases require substantial custom-tailoring. The larger the core, the more likely and feasible the parachuting strategy becomes.

From a study of one system, it is obviously impossible to generalize, but it seems likely that, as with IPS, a central development team will overdesign a Common System and overestimate how much should be in the core, unless local units are <u>actively</u> involved from the start.

When they did make changes to the core, some countries altered the actual program code and also created new data elements. This guarantees immense future problems in maintenance, since this means that IPS-Pothnia is not the same as IPS-Thassin or indeed IPS. Asilta creatively avoided this. The head of systems there argues that a Common System is defined in terms of both common programs and common data elements and that no changes should be made to either. Local modifications and add-ons should be done through interface modules.

This is illustrated in figure 4. The Common System (1) was modified by, among other, Pothnia and Thassin. The input data formats and "front-end data capture" routines, the programs and the database now contain major and minor differences from the original version. <u>The long-term goal of customer integration is now impossible</u>; the two databases are incompatible. There are also two levels of maintenance needed: central and local.

Asilta has made no changes whatsoever to the Milan version, but added modules that translate from the local formats and proceedures to Milan's. When Morden, in the same way, tailors IPS to its own requirements, the two systems are still compatible and maintenance easier. In this strategy, the Common System is viewed as a database on which programs are hung. Many other countries see IPS as a set of programs and have paid very little attention to the consequences of changing data elements.

Obviously, a full data base management software system would reduce this problem. Current DBMS technology is far too expensive and inefficient for this large-scale transaction processing. The TPS experience suggests that many Common Systems will, for some time, be designed in COBOL using traditional file-handling techniques. It seems important, though, to build them in terms of data management not programming of procedures.

This point is reinforced by the difficulty several countries that adopted a crash pace experienced in converting existing files. They focussed on getting the programs modified and tested and then tackled data base creation and conversion. It often has taken an extra year of fire-fighting to get the data right. Asilta spent six months on this before it installed the programs.
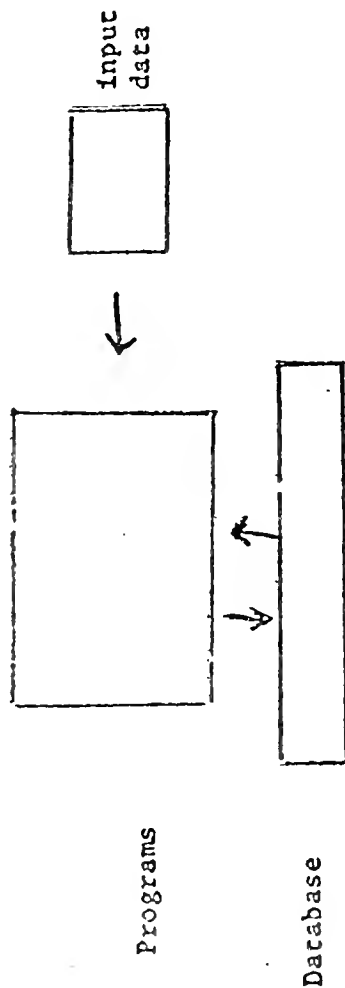
Arnold's systems staff, in Milan and elsewhere work with traditional tools. There is no use of structured methods, HIPO, walk-throughs, chief programmers teams or automated test tools. Decision tables are used in some modules and Milan is currently creating a data dictionary. The technical staff do not seem to have a sophisticated understanding of data management. They approach the implementation of TPS by focussing on procedural programming. The case studies suggest that a Common System needs to be conceptualized as a database not as a set of COBOL programs, even where it does not use a DBMS.

One major surprise that emerged from cases was the wide variation in reliability of TPS in individual installations. With basically the same code and running on IBM 4341's, in one country "crashes" would be far more frequent than in another, which handled the same or even a lower volume of transactions.

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IPS Common Systems: Milan version

FIGURE 4
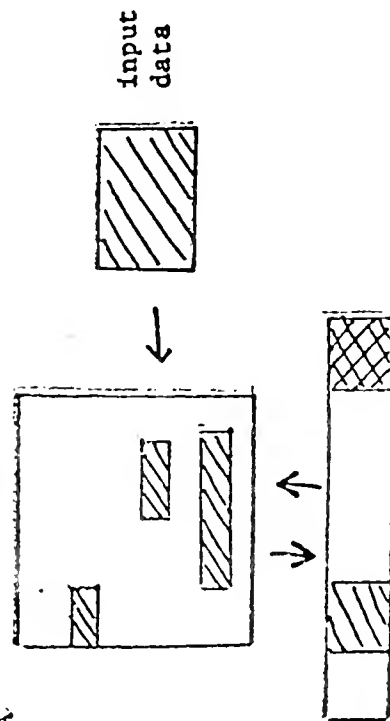## MODIFYING IPS

- ▢ unchanged from Milan version
- ▨ changes to Milan version
- ▨ additions

input data

(1)

Programs

Database

THASSIN

input data

(3)

input data

(5)

MORDEN

input data — IPS format

input data — local format

BOTHNIA

input data

(2)

ASILTA

input data — local format

input data — IPS format

(4)

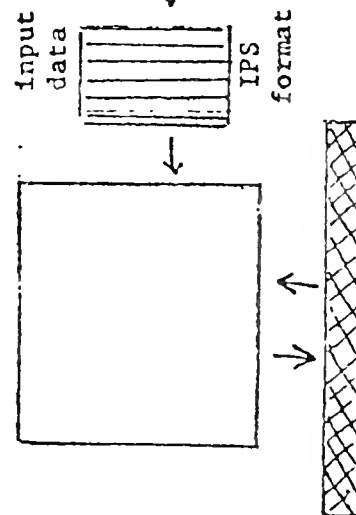input data — local format
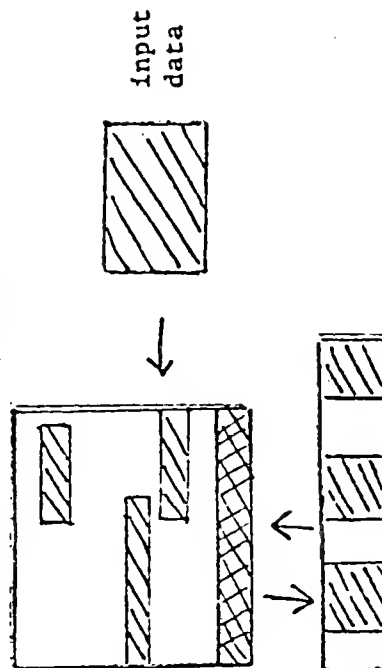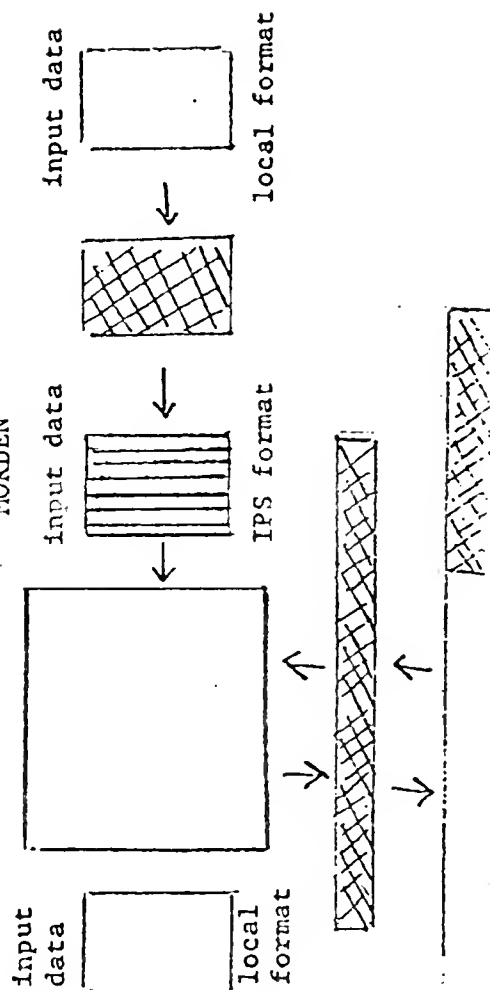
The explanation seems to be that most problems involve the operating system, in this case IBM's CICS. One of the characteristics of a Common Systems effort is that a central elite builds a system that is more complex than many of the local units could develop by themselves. This encourages economies of expertise; Milan could hire a small number of first-rate individuals knowledgeable about CICS.

The local units can neither afford nor in many instances locate this expertise. They must thus rely on the vendor; In Pothnia, the local IBM office is small and its staff not as knowledgeable as elsewhere. In some countries, IBM worked very closely with Arnold's staff and in all cases system crashes are far fewer.

Arnold is just waking up to the problem of central design with local maintenance. Remarkably, the issue of maintenance was not addressed in the initial development or in implementation. IPS is poorly documented and labels mix banking English and Italian. Only a few of the technical staff in the local unit were sent to Milan to learn the system. As a result, if they leave there is no one who understands IPS in detail.

Maintenance is a burden in any major system. A Common System imposes additional strains, especially if modifications are made at the local level. The future cost of maintaining IPS is likely to be vast, as much as $1.2 million a year in a large country where the central bank's regulations change frequently.

Related to this is the issue of auditing and control. Here again, the central group relied on economies of expertise. The Milan system was built with the involvement of the Italian and corporate auditors. Local auditing requirements may be very different. If any changes are made to the system, there may be a need for an audit at both the local and central level.

More importantly, IPS is an integrated, international on-line funds transfer system. This makes security and control far more complex than for standalone batch processing. The auditors need to be involved in design. This is difficult given that local units cannot change the design. In addition, their audit staff may not have adequate experience. IPS is the first on-line application in some countries. The auditors are ill-prepared. The senior auditor for one division, i.e., one continent, stated in an interview with one of the researchers: "telecommunications is just a buzzword".

Bothnia, which deliberately chose a crash strategy and avoided involvement, has found that by not building in controls early, it has had to spend far more time after the fact. In other countries operations maintained its traditional view of the auditors as an antagonist, with the same result. Strenuous efforts are being made by the units currently installing IPS to work cooperatively with the audit function and vice versa. IPS has made the auditor's job much more complicated. Where they involve telecommunications, Common systems introduce a quantum increase in complexity and coordination in the technology with which the auditor needs to be familiar. This introduction, if parachuting is used, comes at very short notice. Arnold's auditors were largely unprepared.

These technical issues largely relate to:

(1) the need for a data-centered, rather than program-centered approach to a Common System

(2) differences in expertise at the local and central levels.

In general, Milan did not initially help resolve this second problem. Parachuting meant a hands-off attitude by the central group; local staff were sent to Milan beforehand, but after that the country was

largely on its own. Ironically, Milan was seen as autocratic, imposing
their system on the country. More recently, there has been far more
interaction between Milan and the local units and staff have been built at
the divisional level to add support.

8. THASSIN & BOTHNIA: TWO LESS SUCCESSFUL IMPLEMENTATIONS

Most of the points summarized in the preceeding two sections are
illustrated by the experience of Thassin, Bothnia, Farlia, and Asilta.
There are three other countries where IPS has been or is likely to be a
major disaster. Thassin and Bothnia are successes in that IPS is in use.
However, the installation was difficult in both cases. Asilta is a clear
success, and Farlia likely to be. The differences in outcome must be
ascribed to implementation factors, since the system is basically the same
technically. They provide an important message: a Common System is
not self-implementing and strategy matters.

Thassin was one of the first IPS implementations outside Europe.
The whole organization was badly taken by surprise. The decision to adopt
IPS was made almost a year before Milan sent the tapes. During that time
virtually nothing was done to get ready.

The head of operations, a dominating figure, took charge. He
worked his staff very hard; 48-hour stretches at the office were frequent.
He believed in "management by fear" and demanded and got a "superhuman
effort". The system was installed in 6 months.

The team responsible for implementation stressed the importance of
user involvement. The people in marketing say there was no involvement
whatsoever. Two full years after installation, at a major planning
meeting, senior marketing managers unanimously complained they still had no

idea of what IPS really is and got no value from it. The country head, who
is also the chief marketing officer, has played a very passive role,
leaving the director of Operations in charge. He feels that IPS is a
success in a technical sense, but a "psychological disaster" from which the
organization may not recover. The Operations head justified the deliberate
exclusion of marketing: "if we had gotten everyone involved it would have
been inefficient".

The Thassin experience indicates the importance of defining "user"
and "involvement" carefully. The director of Operations built an esprit de
corps among the system staff and operations personnel who were the primary
users. Secondary users in marketing were ignored. Marketing sees the
focus of power in the organization having shifted to Operations, since all
the business and information flows are routed via IPS, which they do not
understand or control. They see too many costs and too few benefits for
themselves, and the reverse for operations.

The system group and most operations staff are also not happy with
the system. It never became "ours". The design began before the users
were in the picture and the designers were too far away, in Milan.

The head of operations stresses that Thassin did well to recover.
He is fully aware that there should have been better planning and training.
There was no "reassurance program" for the lending officers, few of whom
had any experience with computers. He found that his most difficult
problem was deciding between conflicting user needs and between Milan and
the Thassin systems group. He felt that Arnold did not have a defined
policy for IPS. He needed someone to be a "referee"; there were too many
unresolved arguments, political rows and ambiguous responsibilities.

The weak role played by the country head partly reflected his view that computers are the territory of Operations and Systems. Many of the lending officers ascribe their own resistance to or apathy about TPS as caused by the lack of clear signals from the top. They were not given a chance to get involved; they did not want to, and since the country head and his senior subordinates were not visibly committed to TPS they saw no reason to be. When, belatedly, Operations scheduled meetings with Marketing, only a few came to the first one and none to subsequent ones. The people sent were low-level and expendable.

One manager, who had been the most outspoken opponent of TPS and of computers in general, became an advocate after going to a meeting at the US corporate headquarters, where he saw how firmly committed the CEO is to ips and the important role computers will play in arnold's business strategy. He feels that a major education effort, with the country head publicly involved, was essential to make TPS work.

Over a 3-month period, the Milan group sent several "top-notch gurus" to Thassin. They stayed for two weeks at a time to help "get the bugs out". That is not regarded as sufficient. No rapport was built and the Thassin system group largely resented the fact that the people whose design caused the problems did not have to pick up the pieces.

The schedule had been determined by the division managers and Arnold's US headquarters. Six months was allotted; TPS would be operational on July 1. The schedule was unrealistic and arbitrary and recalls F.P. Brook's reminder that it takes about nine months to have a baby and that assigning three times as many staff will not reduce it to three months. (Brooks, 1979) The deadline was met, but it was another four months before TPS was stable and fourteen months before the key

profitability reports finally worked. During this period, not surprisingly, there was substantial "bad-mouthing" of TPS.

The consequences of the passive leadership and noninvolvement of marketing have been disruptive. Follow-up interviews nearly two years after TPS was installed indicate a wide culture gap between operations and marketing, substantial resentment on both sides and far less effective use of IPS than in many other countries.

Bothnia's strategy led to similar results, but more discontent, even in Operations. Bothnia's management faced major problems with rising labor costs. It saw IPS as an opportunity to reduce personnel but was afraid that there would be substantial resistance. It decided on a crash strategy. The system was installed as quickly as possible and user involvement was explicitly avoided. The idea was to get the Milan version up and running using Bothnia's data and to make modifications quickly and then add controls.

The system works. It is disliked by clerical personnel who feel that they have had to learn by trial and error. Because of the lack of vendor expertise, it crashes frequently. The auditors are dissatisfied. Far from the crash pace reducing problems, it seems to have guaranteed they will remain unsolved for several years to come. Bothnia's operations department, which had a good reputation prior to TPS, now has a far higher error rate in transaction processing, mainly due to problems in data entry and in the historical data base created for TPS. This means a visible reduction in the quality of customer service.

In Thasin and Bothnia the basic premises of the paradigm of implementation as managing organizational change were violated. In both organizations, superhuman effort and good intentions have resulted in a poor system, loss of morale, a culture gap and continued expense.

9. FARLIA: THE CREATION OF FORMAL LIAISON ROLES

The implementation of TPS in Farlia is still in progress.
However, it seems likely to be a success. It includes two major
innovations in strategy. These were also part of Asilta's approach; Farlia
has formalized them even more and allocated additional resources to them:

(1) the creation of a user representative liaison role

(2) the use of education for "technology mobilization"

In every TPS implementation user "involvement" depended on someone
being available to provide a connection between the technical, back office
and front office groups. The attitude, credibility and perceived authority
of this individual or individuals in fact defines the scope and meaning of
involvement.

Farlia, concerned about the culture gap between Systems,
Operations, and Marketing, appointed a relatively senior manager as the
formal user representative. His credibility came from broad experience in
the bank over a fifteen year period plus his distinctive personal skills as
a facilitator and communicator. His job has been to develop a cadre of
user reps. The country head views him as indispensable and has also given
him the necessary authority to select good people from the line functions
rather than have to accept expendable ones. The poor calibre of users
assigned to the TPS project had been an impediment in several other
countries. Not surprisingly, managers in marketing and operations were
generally unwilling to release their best people.

The major problem in Farlia (and Asilta) in creating a group of
user reps was their lack of a clear career path. The reps were selected
from all departments of the bank; for example, the user rep for the foreign

exchange module of TPS was a supervisor with substantial FX experience.
They are no longer part of the user culture but are also not Systems staff.
Originally, it was expected that they would return to the user department
once TPS was installed, but in practice this is now a permanent role. The
ambiguity of the position and the lack of career precedents worry them.
The senior rep is careful to map out a career plan before he tells an
in?udividual he or she is to be given this new job.

The creation of a formal liaison mechanism seems to have had
uniformly beneficial results. Marketing sees, for the first time, someone
who is trying to help them not impose TPS on them. Planning and training
are more coordinated. That said, there is a feeling that involvement still
starts too late, and that the secondary users are brought in after the key
design decisions have been made.

The technology coordinator for the division of which Farlia is a
part is a senior manager in a staff position that reports to the NY
corporate coordinator in New York and on a "dotted-line" relationship to
the division head. He has no direct responsibility for implemmentation of
TPS but has increasingly used resources and influence to create the user
rep role in Farlia and to build up a sizeable training center. He points
out that involvement is possible only if people have a common vocabulary
and base level of knowledge. He uses courses to make computers a reality,
show non-technical personnel how to participate and make them face up to
the fact that TPS is coming.

While reactions to the courses vary, there seems to be an
agreement in Farlia, among staff and managers, that they have bridged the
culture gap. The combination of user reps and education for what the
coordinator calls "technology mobilization" represents an abandonment of

parachuting, a reliance on a slower pace and a shift of authority from the technical staff to the reps.

The Farlia experience highlights issues largely ignored in the literature on user involvement (see Diokno, 1981):

(1) involvement requires skills, methods, and a vocabulary, not just affable good-will

(2) it must be formalized and draw on capable, credible people who have the necessary functional expertise and are good facilitators

(3) it is expensive, adding new staff roles and training courses to the budget.

10. ASILTA: IMPLEMENTATION AS ACCULTURATION

The implementation strategy used in Asilta was explicitly developed by the head of operations, Mr. Leander, and the senior project leader assigned to IPS, Mr. Pausanias. It partly reflects the learning curve Arnold had gone through with IPS, beginning with the overoptimistic, unidimensional approach of Pothnia and Thassin, and moving towards the supporting unfrastructure developed in Farlia.

It also, however, reflects high quality leadership. In many countries, there was little reflective planning. Leander and Pausanias from the start focussed on the problems of taking a system developed elsewhere and building a sense of local ownership. The key components of their strategy were:

(1) early planning and a delay in installation in order to build a local capability and to use Milan for advice and education

(2) meaningful involvement and the development of a strong user team

(3) a "campaign to explain" that included education and public involvement by top management

(4) a phased development in which timetables were determined by the users' pace and not vice-versa

(5) data-oriented rather than program-oriented
    development

The sequence of events covers three years. In late 1977, Leander and Pausanias visited Milan as part of an analysis of how Asilta could move to on-line processing. The Asilta team decided to implement TPS. There was substantial pressure from Milan and New York to do so quickly. Top management in Asilta, mainly at Leander's uring, resisted this:

> [Leander] was firm enough with our plans to tell
> Europe 'no, we'll do it on our time schedule'.
> He supported us against institutional pressure.
> His support and willingness to take long enough
> were of key importance. (Head of Systems)

It was not until early 1979, over a year later, that the technical work began. During the first half of 1978, Asilta tried to learn as much about TPS as possible. The senior auditor visited almost every TPS site. Four personnel from Operations and one from Comptroller's went to Fsondina for five months. Fsondina was in the process of implementing TPS with little preplanning. The Asilta team "learned from their mistakes. After Fsondina we had a more realistic picture". (It was Fsondina that later described TPS as a culture shock and emphasized the need for good user reps and indepth training, neither of which had been provided.)

The first half of 1979 was devoted to building strong teams of user reps and to begin training. The reps, some of whom had no background in data processing, practiced on dummy terminals and were given TPS manuals. This was not effective. Milan sent a consultant early in 1979:

> He brought it all together. The first six
> months were really wasted. If he had been here
> from the beginning we could have gotten into
> comprehension much sooner. This way it took a
> lot of time for us to understand fundamental
> theory.

The consultant arrived at the same time as the IPS tapes. He acted only as an adviser. Unlike Pothnia, the Asilta local system team did not resent his coming: "We knew he was only temporary!" Leander and Pausanias had been very concerned to maintain local pride. They insisted that their staff would lead the project.

The first step in installing IPS (late 1979) was to convert the old data base. Every other country had started by converting the program. The conversion took almost six months. The auditor's staff were heavily involved. It was not until mid-1980 that work began on the first module, foreign exchange. This application was selected because processing was currently mainly manual; its quality was poor and the volume of data low. The user reps had some trouble finding a skilled user:

> We were working with the department, but we just
> didn't have the right person, so some of the key
> processes were being left out. We finally had
> to involve a first line supervisor with more
> detailed knowledge of the proceedures.

The strong support given the reps by senior management and their own credibility gave them the implied authority to make this change, which required the replacement of the original supervisor.

As with other implementations of IPS, there were many problems, especially with data quality. Instead of sending tickets to be processed overnight, staff now entered data at the terminal. Leander introduced a requirement that all input errors be corrected and all input completed before employees went home. This meant staying till midnight in some cases. Operations personnel had to work all weekend for several months.

During this period, there was growing discontent especially among older supervisors and some loan officers. Leander accelerated the education process:

> We had a lot of minor problems that added up to
> a larger problem. We had questions from every
> department. Eventually we had a campaign to
> explain.

The user reps were responsible for training all employees who had
to work with IPS. The process began with a presentation by senior
management which explained the business strategy behind IPS and, in
addition, provided a public statement of commitment. Overview courses were
given to 300 employees, who also receive regular newsletters on IPS, its
schedules and progress.

The user reps met regularly with supervisors and also held
informal meetings with small groups of employees to explain details of IPS,
dispel rumors and discuss concerns. Other courses provided hands-on
experience with computers. Dummy terminals were available for anyone to
practice on:

> I read the manuals for months, but I only under-
> stood what was going on when I started to work
> with the terminal. I learned most by practice.
> (data entry supervisor)

The education process was extremely effective, and led to a
helping relationship across the whole organization. Old "students" became
new "teachers":

> My chief taught me all the work. Both of us
> learned by practice. . . Always people resist a
> new system. . .When the users in other sections
> in the bank have any problems, they call me, so
> I teach them. (assistant data base
> administrator)

> I don't know how to make a program and they
> [systems] don't know how to input the data. So
> I need them and they need me. We teach each
> other and learn from each other. (user)

Leander and Pausanias maintained strong control over the schedule.
They resisted every pressure to speed things up (although by mid-1981 they
were far further ahead of countries that started earlier, in terms of the
number of modules implemented). Pausanias cautioned:

> IPS is not implemented in Asilta. It's like
> speaking one word of English and saying 'I speak
> English'. IPS is like that—you put in a little
> piece and you say it's here. That's just not
> true. It's a concept. It will take years; it
> will never be 'finished'.

Pausanias had identified data quality and control as key to
successful installation. This was a major reason for careful phasing and
for the close cooperation with the auditors. Asilta avoided making any
changes to the core of IPS; the design sequence was:

(1) convert the existing database to IPS

(2) define necessary local modifications

(3) build interface modules

(4) "test, check, test, check, test, test, test."

The development team worked closely with the local IBM office,
who sat in on most meetings that discussed schedules or technical issues.
The three most obvious facets of the Asilta implementation were
cooperation, teaching and phasing; every unit whose support or knowledge
was needed for the long-term success of IPS was brought in _early_.

The Asilta strategy stands out from any other. It needs to be
stressed that no consultant or OD (organizational development) specialist
recommended it. Arnold is a hard-nosed organization, with a reputation for
tough treatment of personnel. Leander's subordinates see him as aggressive
and firm. Pausanias is, however, unusual for a data processing specialist
in his concern for organizational issues and for people. The strategy
reflects not a prior committment to participation or OD, but a realization
that the degree of change implicit in IPS required careful preparation and
that:

> User involvement, education and commitment are
> it—that's successful implementation. (Asilta
> country head)

Leander and Pausanias saw the consequences of no involvement, no
commitment and no education, especially in Fsondina. Their acculturation
approach seems to represent the necessary strategy - necessary in terms of
experience - for this Common System.

It is worth asking why it took so long for this approach to
evolve; even now, at least six countries are trying to parachute IPS in.
From the interviews across Arnold's four divisions, the main reasons seem
to be:

(1) the assumption that IPS is a complete package

(2) the existing culture gap between technicians and
users, the absence of a commitment at the top to
closing it, and a consequent lack of resources for
liaison and education

(3) a view of training as something to be tacked on
after installation

(4) an aggressive "can-do" attitude among many managers
in Systems and Operations that encourages a crash
pace

(5) a narrowly defined view of "user" and involvement
which results in, at best, pseudo-participation

(6) the traditional focus among technicans on design and
an ignorance of or even disdain for "people" issues.

IPS is virtually the same piece of technology as in Thessin,
Bothnia and Asilta (and in Coliador where the poor quality of the existing
operations suggests that IPS will lead to complete chaos, and in Gotland,
which has the best technical staff outside Milan, but where IPS is already
two years behind schedule and morale very low). The obvious point is that
the huge differences in outcome reflect differences in implementation
stategy and that installing Common System is only partially a technical
venture.

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11. A STRATEGY FOR COMMON SYSTEMS DEVELOPMENT

The overall strategy for Common Systems development that emerges from Arnold's experience is consistent with but expands on the organizational change paradigm, which identifies three main phases:

(1) unfreezing - creating a momentum for change, building realistic expectations and developing a joint contract between the insiders and the outside change agent

(2) moving - the "technical" steps

(3) refreezing - institutionalizing the change, teaching and reinforcing the necessary skills to manage the system and building a sense of local ownership.

This strategy is especially effective for tactical change: small-scale projects affecting a few actors or units (see Keen, 1981a).

A large-scale Common System effort represents massive change with potential immediate shock. The unfreezing stage thus requires even more attention and effort. Figure 5 shows six main stages for Common System development that provide for this and for a careful acculturation approach.

The first stage is Expectation Setting. Many of the problems encountered in the implementation of TPS reflected unrealistic expectations. A Common System is brought in from outside. Individuals inside the organization need to:

> (1) look at the experience of other sites, visiting at
>   least a few of them
>
> (2) alert top management to the resources, time frame
>   and commitment required
>
> (3) make a clear arrangement with the central
>   development group for consulting, support and
>   education
>
> (4) identify the mechanisms for user involvement

The next stage, Technology Mobilization, seems critical and too easily neglected. Expectation Setting gets the development team and top management ready for the venture. Technology Mobilization:

> (1) builds the team of user reps team(s) who are the
>   internal change agents, coordinators and educators
>
> (2) uses education to:
>   (a) inform the wider organization
>   (b) publicize the system
>   (c) demonstrate top management's commitment
>   (d) provide a common set of concepts and vocabulary
>   for user involvement
>   (e) build skills
>   (f) create a forum for discussion

The user reps need career paths. The selection process involves identifying individuals who have a relatively unusual combination of experience in the organization, visible expertise in the functional area, and good communication skills. Line managers will give up such people only if:

> (1) top management has provided enough authority to the
>   senior implementer
>
> (2) the nature and importance of the implementation
>   effort has been demonstrated to line management

FIGURE 5

A STRATEGY FOR COMMON SYSTEMS DEVELOPMENT

Unfreezing: Planning & Design

    (1) Expectation Setting
- definition of the core
- clarification of central versus local roles
- identification of mechanism for involvement
- identification to top managers of resources, lead time and commitments needed

    (2) Technology Mobilization
- build user rep team(s)
- start education process
    inform and publicize
    demonstrate commitment
    provide commoon vocabulary and concepts
    build skills
    create forum

Move: Installation

    (3) Data Conversion
- create data base
- assign responsibility/accountability for data quality

    (4) Core Installation
- use central staff as consultants

Refreeze: Transfer

    (5) Local Adaptation
- build interface moduler

    (6) Evolution
- complete training
- assign user manager
- define maintenance strategy

(2) user managers and supervisors are convinced that
     promises of involvement will be met.

Accomplishing this is not something that can be done quickly. It obviously
also requires leadership.

The education process also takes time and substantial resources.
The user reps have to learn the system: here, the central development team
can be invaluable. Then, depending on the scope of the system, users'
existing experience with computers, and previous training courses, some
combination of the following will be needed:

(1) a basic course on computers, emphasizing uses, with
     opportunity for hands-on experience

(2) an introduction to the Common System, focussing on:
     (a) its objectives
     (b) the changes it will lead to in work proceedures
     (c) data management
     (d) outputs and uses
     (e) what has to happen to make it work

(3) small group discussions, demonstrations and review
     of progress

The user reps lead the education process, even though outside teachers or
local or central systems staff do much of the teaching and presentation.

Without this mobilization, the needed base for acculturation is
missing, and one can easily predict the likely consequences; these are
illustrated by the Thassin installation. Given the base, the technical
work can begin with the activity where users, supervisors, and user reps
play the main role: data base creation or conversion. While IPS is not
representative - there is no "typical" Common System - it seems likely that
in most cases getting the data right is the key challenge; the programs
already exist. The desirable sequence seems to be data base creation,
installation of the core, and then adaptation to local requirements. This
last process must maintain the integrity of the Common System if

standardization and corporate integration are long-term objectives.

The final stage is transfer of the system to the user department. Training must be completed, with sufficient time allowed for users to gain confidence and experience. It is likely that a user rep will move into the department to act as a permanent manager and coordinator. Because the system is a combination of a centrally-developed core and locally-developed routines:

(1) a clear maintenance strategy must be defined

(2) a mechanism for ongoing review between the central
and local development teams should be set up.

Figure 6 summarizes the key design issues the central development group must resolve to facilitate the local implementation efforts.

The central problem is to define the scope of the core. This obviously requires very careful exploration of the range of local variations. In the case of TPS, this was not done, because the original system was built for Italy. The range of local variations in Arnold is immense. There are differences in banking regulations, markets, competitive issues and existing proceedures and data formats that obviously affect the details of transaction processing. It would take a lengthy survey and substantial involvement of local units to identify them. They are likely to reduce the scope of the core and thus make parachuting even more inappropriate, since substantial local adaptation will be needed and· anticipated.

The relationship between central and local development units is potentially one of confict, not cooperation. The central team needs some degree of authority if the system is to be truly Common. The lack of an explicit policy on central authority versus local autonomy in Arnold resulted not only in the Far East rebellion, but a disruptive, prolonged

FIGURE 6
DESIGN ISSUES FOR THE CENTRAL DEVELOPMENT TEAM

(1) Identify overall range of local variations

(2) Define scope of core

(3) Develop routine consultant/teacher

(4) Identify key local contacts; provide early forum for design review

(5) Clearly define central versus local authority and accountability

political conflict. The central authority also, however, needs to act as a
service unit. This means explicitly building a routine capability for
consulting and teaching.

12. CONCLUSION

The main lessons for Common Systems development that fall out of
this analysis can be divided into descriptive and prescriptive conclusions.
The descriptive ones highlight what is likely to occur and the prescriptive
ones define components of a strategy for effective implementation.

The descriptive lessons are:

(1) Common Systems may encourage a parachuting
    mentality, and an isolation of the designers from
    the organization their creation affects

(2) there are unrealistic expectations about the
    necessary degree of local adaptation if the scope of
    the core is too broad

(3) operational concepts of user involvement are vague
    and narrow

(4) the development is likely to be program-oriented,
    rather than data-oriented

(5) local vendor expertise has substantial impact on
    technical quality.

(6) leadership, education and involvement have a major
    impact; the same basic system is successful in one
    location and a failure in another because of these.

The major, somewhat disconcerting, descriptive conclusion , if
this organization is typical, is that the well-understood principles of
implementation as the management of change (see Keen, 1979) are not part of
the technician's knowledge base. The technocentric view persists and
resources for expectation setting, education and liaison are not provided.
Parachuting is a naive strategy; it is gradually abandoned under the
pressure of experience.

The main prescriptive lessons are:

(1) the importance of the pre-installation phases and
    the consequent need for careful scheduling

(2) the value of formal user representative liaison
    roles

(3) the need for persuasive, substained education

(4) the importance of authority and leadership

The ongoing research study focusses on these last two issues.
Education for technology mobilization seems to be a underused strategic
vehicle in implementation (see Pronsema, 1981). Keen (1981b) defines the
links between authority, responsibility and non-technical resources as a
major policy issue in effective management of the organization's computer
resource.

Zuboff (1981) examines a topic which though outside the scope of
this paper is among the most important questions for research on the
development of computers systems in organizations: the impact on work.
She reports that TPS and similar on-line systems increase the abstraction
of work and pose new problems in how people experience their jobs, make
sense of them and try to deduce management's intentions.

As computers become more and more central to the business strategy
of organizations and most of their work is mediated by computer terminals
(Zuboff), large on-line Common System projects like TPS are likely to
become more frequent. The stakes are high, in terms of financial and human
cost. TPS has occupied the attention of a large part of Arnold's
management and staff for nearly five years. It is a great success, a
partial success and a clear failure. It has increased and reduced the
culture gap. It created a raging political debate. It shattered morale in
several units. It is a great leap forward and has given Arnold an

important competitive advantage. It indicates the importance of
implementation strategies and indeed the fact that much of implementation
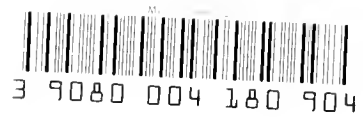is managerial Common Sense.

REFERENCES

1 See Keen, P.G.W., Policy Issues in Managing Computers: A Top Management Perspective, CISR Working Paper, forthcoming, September 1981.

2 For a recent evaluation (and defense) of case studies as a methodology, see Yin, 1981.

3 See Keen (reference 1) for a more general discussion of the need to link authority and responsibility.

BIBLIOGRAPHY

Bronsema, Gloria, The Implementation of Computer Technology: Does Education Have A Role?, unpublished paper, Harvard Graduate School of Education, August, 1981.

Brooks, Frederick P., Jr. The Mythical Man-month, Addison-Wesley Publishing Company, Reading Massachusetts, 1975.

Diokno, Ramon, "General Management Issues: Making Effective Use of Computers", Massachusetts Institute of Technology/Sloan School of Management, Masters Student Thesis, June, 1980.

Keen, Peter G.W., Information Systems and Organizational Change, Communications of the ACM, Vol. 24, Number 1, January, 1981.

-------, Implementation research in OR/MS and MIS: description versus prescription. Research paper No. 200, Graduate School of Business, Stanford Univeristy, 1977.

-------, Policy Issues in Managing Computers: A Top Management Perspective, CISR Working Paper, forthcoming, September, 1981.

-------, Implementation Techniques, Paper prepared for the Diebold Automated Office Program, August, 1979.

George, Alexander L., Case studies and theory development: the method of structured, focussed comparison, in Diplomatic History: New Approaches, ed. by Paul Gordon Lauren, The Free Press, 1979.

Kolb, David A. and Frohman, A.L., An organizational development approach to consulting, Sloan Management Review, Fall, 1970.

Zuboff, Shoshanah. Psychological and organizational implications of computer-mediated work, CISR Working Paper No. 71, Sloan WP No. 1224-81, Center for Information Systems Research, Massachusetts Institute of Technology, June, 1981.